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Additional species of *Opuntia*

DAVID GRIFFITHS

(WITH PLATE 30)

Plants of the following species have been growing in our collections for the past five to eight years. Some of them have been held under provisional names for a long time in the hope that they might eventually be referred to species already described. They can not, however, be so referred and must receive new names.

Opuntia columbiana sp. nov.

A low, half prostrate species, seldom over 15 cm. high; the distal joints mostly erect, the ones on the ground rooting freely; joints narrowly obovate, about 5 × 15 cm. in last year's growth, at first yellowish to medium light green but the second year becoming decidedly yellowish green, slightly raised at areoles, fragile, and easily broken, making it very difficult to grow plants to maturity; areoles subcircular to obovate, 2 mm. long, enlarging in age and prominent, 2 mm. high on account of the profuse development of wool, light brown; spicules yellow at first, in a compact tuft 1 to 1.5 mm. long in upper part of areole, later, especially the second year, becoming unequal and scattering, and 5 mm. or more in length; spines yellowish to white, centrals one to three with one long, porrect or sloping down 3-4 cm. long and the other one or two 2 cm. long and widely spreading, and commonly three or four about 1 cm. long in the lower angle of the areole tightly recurved, often there are two or three porrect-spreading, long spines, and the others (three short and about two 2 cm. in length) all tightly recurved; flowers light yellow, filaments reddish brown, style white, stigma light green.

This species is apparently confined to the sandy lands along the Columbia and Snake River valleys, and is particularly abundant near Pasco, Washington. The above description applies to my inventory No. 10041, from Pasco, Washington, but the spines vary greatly in color, and associated with this difference in color of the spines is a comparable difference in coloration of the plant body. Specimens collected under my inventory No. 10042 have

darker colored spines; the joints commonly about 4×9 cm. and the spines in part brown, especially on apex of joints.

***Opuntia cucumiformis* sp. nov.**

A low, branched, cylindrical-oval-jointed plant, 18 cm. high and 35–50 cm. in diameter; at first yellowish green, turning gray; joints 10 cm. long, 3.5 cm. in diameter, broadly pointed to rounded above, cylindrical, tubercular, raised at areoles, the low, rounded ridge extending downward 1.5–2 cm.; areoles obovate, 2.5 mm. long, gray, rather sunken, 1.5–2 cm. apart, only upper ones armed; leaves conical, ascending, 5 mm. long, slightly flattened on inside; spicules yellowish, at first not visible but at one year of age filling entire areole, which becomes subcircular, the spicules developing in successive lengthening zones from center of pulvinus; spines yellowish, translucent, bone-like, 1–2.5 cm. long, porrect, diverging but slightly, one to five in upper areoles only, not sheathed; flowers deep yellow, lighter within, having faint tinge of red in upper edges, about two rows of petals opening to 4 cm. in diameter; filaments white, style white, stigma white, variable, six-parted, small; bud distinctly reddish tinged at apex which is bluntly pointed and subtended by spicules, 3–5 mm. long, from the marginal areoles of the ovary; fruit oval to obovate, about 16 by 38 mm., deeply pitted at apex with small cavity about 4 by 8 mm. containing numerous small, atrophied ovules, its areoles small and distant below but closer above, bearing around top of ovary one or two yellowish spines 12–15 mm. long, and a small tuft of spicules 4–5 mm. long.

This species has been received from European collections as *Opuntia ciribe* Engelm., a native of the peninsula of Lower California, but it has little relation to that species and in all probability is native to the Cordillera region of South America. Several plants of it have been grown to maturity, but in no case have the fruits, which are produced in considerable abundance, matured seeds. The pulp cavity is always empty and the fruit remains attached to the plants indefinitely.

***Opuntia calantha* sp. nov.**

A low, creeping, prostrate species, 15 cm. high and a meter in spread; joints obovate, sub-pointed above and below, inequilateral, about 4×11 cm., tuberculate-wrinkled, mostly deep green; areole small, 1–1.5 mm. long, obovate, at first tawny, turning gray; leaves small, subulate, cuspidate, red, 1 mm. long;

spicules yellow, not prominent at first but later 3-4 mm. long and scarcely distinguishable from the spines, from which they differ only in size and position, and very slightly in color; spines white, short, porrect-divergent, five to ten in number, 5 mm. or less in length with often as many spicules a trifle less divergent in upper portion of areole; flowers carmine, filaments carmine, stigma very deep, dark green, thirteen-parted, with short segments and open throat; fruit, with us, greenish to yellowish, hemispherical, deeply pitted, 1.5 cm. in diameter.

This species is more or less common in European collections, and is probably of South American origin. It is commonly received as *Opuntia microdisca* A. Weber, but differs from that species in almost every diagnostic character. We have had plants of it in blossom for three or four years but in no case have fertile fruits been produced, although hand-pollination has been resorted to and natural pollination by insects has been universal. The reason for this sterility is not apparent, but it may be due to our intense heat and drought during the time that the flowers are open.

***Opuntia longiclada* sp. nov.**

An erect, open-branched shrub a meter or more high and having a spread of 2 m.; joints elliptical, widest slightly below middle and gradually narrowed both ways, pointed above and below, commonly 12×36 cm., this season's growth now in blossom commonly 10.5×33 cm., at first rather bright yellowish green, turning slightly gray green yet having but little bloom, slightly raised at areoles and this disappearing the second year; areoles gray or light tawny, oval to subcircular, commonly 4 mm. long, bearing a darker central area; spicules inconspicuous, yellow, becoming noticeable and 2 mm. long in a compact, connivent tuft in upper portion of areole at one year of age; spines one to three, 1-1.5 cm. long, yellow, turning white, increasing with age to six to eight and often becoming 3 cm. long, usually one or two on sides of joints and more numerous on edges, flattened, twisted, with translucent tips; flowers yellow, greener within, 5.5 cm. in diameter or 6 cm. when fully opened; turning deeper yellow and developing the faintest tinge of red within at close of day; filaments greenish, style white, stigma large, light green, nine-parted; inner petals nearly orbicular; buds dull light green with tinge of dull red on the upper edges of the sepals; fruit pyriform, purplish red throughout. (PLATE 30.)

This species has been carried in our collections for the past

eight years under S. T. G. No. 2838, and has been grown successfully in two situations in Texas besides Chico, California. It was not known for a long time whether it was hardy or not, consequently we grew it inside at Chico where it produced a moderate crop of fruit and a prolific vegetative growth. In the field, however, its vegetative development is very much curtailed but it is loaded with fruit. It was received originally from some European collections. Since being transferred to Chico it has grown under S. T. G. No. 2838. Its natural habitat is unknown.

***Opuntia platynoda* sp. nov.**

A low, erect to ascending, densely branched, fragile-jointed species, seldom 45 cm. high, but often 60–100 cm. in diameter; joints flattened, small, obovate to mostly fusiform-oblong, 4×13 cm. for old joints of this season, but very variable, many joints of last season's growth only 3.5×9 cm., dark, glossy green, and darker and often purplish below the areoles, which are slightly raised, tubercular at areoles first season but later entirely smooth, but always more or less darkened in color below them; areoles gray to light tawny, obovate, about 4 mm. long, increasing in age to subcircular; spicules at first inconspicuous in a small tuft in upper portion of areole, but later at two or three years occupying half of the areole, and fading to a light dirty brown or yellowish; spines erect, divergent, at first brown, turning through a mottled condition to white with translucent bone-like tips, flattened, twisted, stout, one to three, seldom four, with lower areoles naked, upper terete spine largest, 2.5–3 cm. in length, and ascending or porrect, the others lateral or situated directly below, besides these often there are two delicate short lower lateral ones, 3 mm. in length in addition; flowers lemon yellow, 4.5–5 cm. wide when fully opened, outer segments greenish red and tightly appressed as is typical of South American forms in the bud; petals tipped with greenish red, obovate, retuse, and minutely cuspidate in the notch; filaments white, style white, stigma white, six-parted, petals about 3 cm. long; fruit pyriform, green with blush of greenish red on one side, or entirely greenish red, with exception of basal portion, large, subcircular, gray to tawny areoles, 12–18 mm. apart, and an occasional short spine.

With us the plant grows very rampant in the sash house, requiring constant pruning to keep it in check. It blossoms very freely in June and July. Up to this time the fruit has been all but sterile, none having over one half dozen mature seeds, but a

great many aborted ones, showing that there is something wrong with the fertilization of the plant in this situation.

The description is drawn from No. 9266 P. I. G., cultivated at Chico, California, from cuttings secured from European collections. I have no definite information of its habitat, but feel certain that it is of South American origin. Its affinity is clearly that of a large group of South American species with short, blunt buds of closely appressed, wide, thick scales, short leaves, and copperized areolar stains. The species is frequently injured by cold weather out-of-doors at Chico, California.

OPUNTIA MICROCARPA Engelm.

A stout, robust, large-jointed, erect species, making a bush 1.5 m. high and 2 m. in spread, with the main lower arms mostly resting on edges or self-supporting, ascending or nearly horizontal; joints large, light bluish, moderately glaucous, often 25×35 cm., sharply rounded above, not raised at areoles after first year; areoles variable in size, light brown, obovate, 5–6 mm. long on sides and some 8 mm. on edges of last year's growth, becoming subcircular and black in age; spicules light-brownish yellow, scattered, unequal, 3–10 mm. in length, not especially prominent excepting on margins of joints; spines white, with brown bases of very ununiformly tinted but always dull and dark brown, strongly flattened, twisted, bent and variously curved, variable in number and length, two to six and 1–4 cm. long, increasing in length and numbers in age; flowers large, 9–10 cm. in diameter, yellow with greenish centers, filaments yellow, style greenish to very faintly reddish tinted, stigma large, deep green, ten- to thirteen-parted, coarse; buds rather sharply pointed, olive green with a very faint blush of red in the tips of the outer, lax to recurved sepals; fruit deep purplish red throughout and bearing prominent, tawny areoles, having the usual quota of spicules, rather lighter than those of the plant, and a few fugacious spines 1 cm. long; umbilicus broad, flat to slightly concave.

This is one of the larger, more robust of the southern Arizona species. The description of the spines might be misleading for the general impression which they give is that of white, leaning toward that peculiar translucent aspect common to so many species. It is not at all abundant but occurs commonly in scattering individuals in the foothills at an elevation of about 3,000 feet. This is the first time this species, which was named by Dr. Engel-

mann* from Stanley's figures, has been recognized, although it has a considerable known distribution and is a very characteristic thing. I have seen fine specimens of it in the type locality near Solomonville, Arizona, and at various points to the southwestward. It extends in this direction as far as the Tucson region. I have had it in manuscript under a provisional new name for years from the latter region, but refrained from publishing on account of a suspicion that it might be this species on account of the shape of the joints as shown in the Stanley figures. A careful study of the pears of the type locality leaves no doubt in my mind as to its identity.

***Opuntia crystalenia* sp. nov.**

An erect, tree-like form, 2–2.5 m. high with a distinct cylindrical trunk and tree-like top; joints broadly obovate to nearly subcircular, about 18×25 cm., glaucous, blue-green, becoming more yellow after two years of age, at one year about 3 mm. long on sides of joints but enlarging irregularly and becoming subcircular in age, at first tawny but turning gray; leaves small, 4 mm. long, subulate, cuspidate, slightly flattened and becoming somewhat recurved at tip; spicules yellow, in a compact tuft in upper part of areole, not prominent, scarcely protruding from surface of joint, increasing only in occasional areoles in age; spines white, porrect in upper two thirds of joints only, one to three or four, usually two, variable, the longest 10–15 mm. in length and there are usually present one to two or three hair-like, delicate spines besides in the lower angle of the areole; flowers yellow, lighter colored within, filaments yellow above and greenish below, style white, stigma large, conical, dull dark green, ten-parted; buds light, dull greenish red, with a slight grayish, glaucous sheen; fruit subglobose, medium sized, about 4–4.5 cm. in diameter, light red all the way through, flower-scar moderately dishd to nearly flat, areoles tawny to brown, about 8 mm. apart and having prominent wool, variable spicules 1–2 mm. in length and four to ten delicate fugacious spines, 4–12 mm. long, tawny brown.

This is a common species both native and in cultivation upon the Mexican highlands and is prized for its edible fruits. The type was collected at Cardenas, Mexico, under my inventory number 8030 in August, 1905. It has been grown in our experimental plantings at Brownsville and San Antonio, Texas, and Chico, California.

* Emory's Recon. Append. 2: 158. 1848.

***Opuntia ithypetala* sp. nov.**

A tall, erect, tree-like, open-branching plant 2 m. high or more with a distinct trunk and widely spreading, ascending to drooping branches; joints large, obovate, contracted below into a long stipitate base, very often 19×45 cm., but commonly only 14×26 cm., bright dark green, tubercular-raised at the areoles, the surface not becoming flat and smooth for two or three years at least, bright dark green, mostly without bloom; leaves subulate, cuspidate-pointed, slightly flattened, 5–6 mm. long; areoles oval to subcircular and often 1 cm. in diameter, 4–5 cm. apart on sides of joints; spicules not visible; spines white on second year's growth, three to five, mostly three or four, the central one porrect and largest 3–4 cm. long, the lower one short, 1–2 cm. and recurved, the others divergent, flattened, twisted, formidable, increasing on old trunks to six to ten and often becoming 8 cm. long and very stout; flowers light canary yellow, fading to light rose purplish late in the day, the petals erect, not spreading, becoming 3 cm. in diameter when fully opened; filaments white to slightly greenish below and very light pinkish tinted above, style white, stigma very light green, six-parted; buds conical-pointed, light olive with only a tinge of red at the tip, the scales wide and closely appressed; fruit light purplish red, slightly raised tubercular at areoles and deeply pitted, each upper areole bearing mostly 1 white, porrect spine 1 cm. long and occasionally an additional smaller one 3 to 5 mm. long below the big one, the pulp being much deeper purplish red than the outside and brittle with a pleasant touch but not very sweet.

This species was received from the Royal Botanical Garden at Berlin as *Opuntia Hanburyana* A. Weber. It is more closely related to *Opuntia Schumannii* A. Weber but as the description above indicates it is very different from either one. It agrees with the latter in having the petals erect when the flower is fully opened; it does not agree with the former in any particular. It has been grown to maturity very successfully in our two situations in Texas as well as at Chico, California. When first received it was assigned the inventory number of our San Antonio garden, 506, and under this number it has been carried at Chico, California.

***Opuntia rubiflora* sp. nov.**

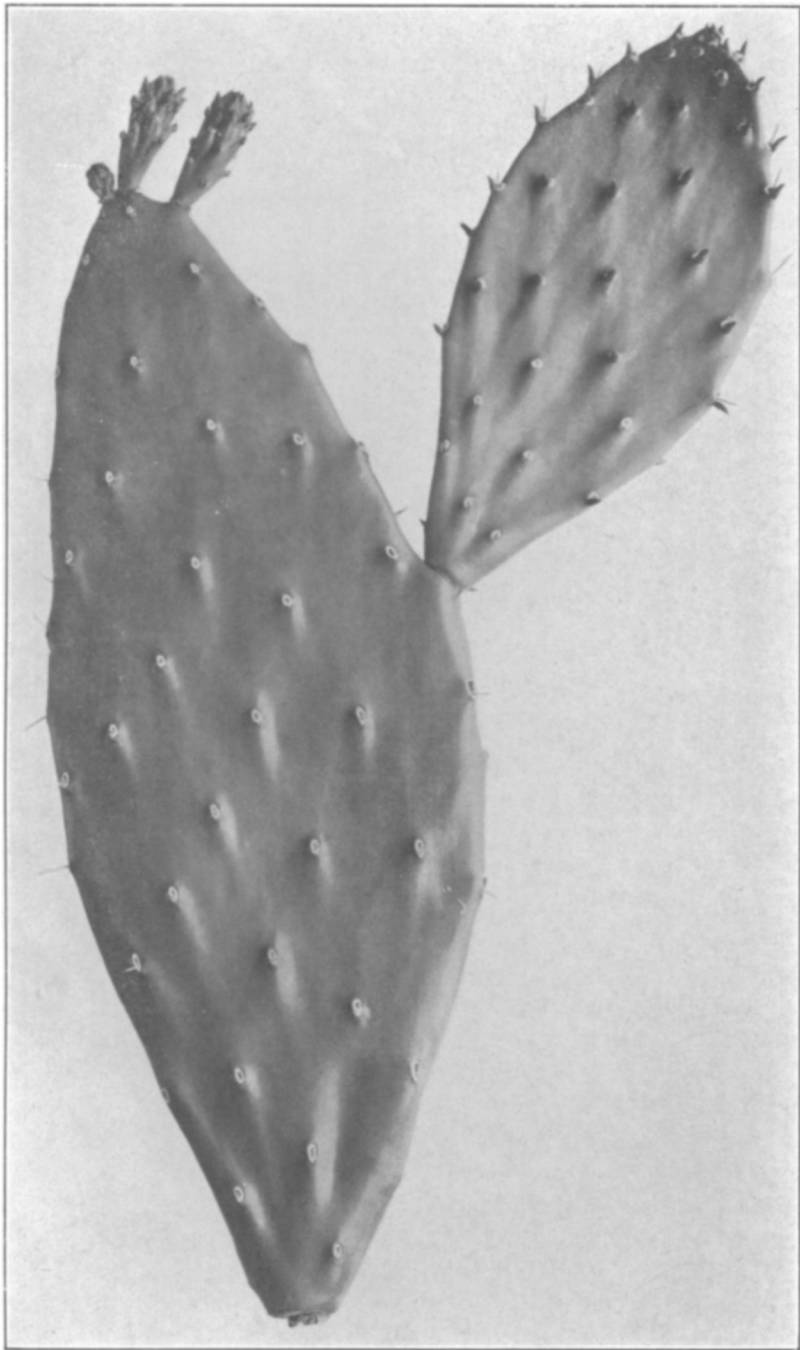
Plant low, spreading, 30–45 cm. high and having a spread of a meter or more; joints obovate, mostly 12×18 cm. in last year's growth, but older ones larger, medium dark green with a little

pruinosity, broadly rounded above and gradually narrowed below into a short stipe; areoles obovate above and subcircular below, about 3-4 mm. long with prominent gray wool the second year; spicules brown on this year's growth, changing to yellow in situ the second year, situated in a compact tuft in upper portion of areole, 2 mm. long; spines white with brown to straw-colored bases, on last year's joints two or three, usually one recurved 1-2 cm. long, white, the others stouter, 3-4 cm. long, white with brown to straw-colored bases, porrect, divergent, flattened, slightly twisted and at times showing a very faint annulation, increasing and becoming six to eight in number and somewhat lengthened in age; bud medium-pointed with loose, narrow scales of an olive green color but with a tinge of dull pinkish red in the upper portion; flowers pink, filaments yellow, greenish below, style white, stigma very light greenish, six-parted, with long-pointed divisions which are cuspidate, the general shape of the stigma being conical.

The species was received originally in the form of cuttings from European collections, designated by an unpublished varietal name under *Opuntia camanchica* Engelm. & Bigel. It is, however, a perfectly good species. Its habitat was not stated.

***Opuntia megalantha* sp. nov.**

A tall, robust, erect, open-branching plant 2 m. or more in height; joints obovate, broadly rounded or often, when young, bluntly pointed above, becoming more rounded the second year, glaucous-gray-green, last year's joints commonly 14 × 21 cm.; areoles at first brown turning gray, variable, oval-obovate to subcircular, enlarging in age, about 3-5 mm. long the first season; spicules yellow, scattered through the edge of the areole, wool 4-5 mm. long, increasing slightly in age but only in scattered places on the plant, usually there is no increase at all but the wool increases or grows anew and the areoles on the old trunks three or more years old often bright brown like new growth, often becoming transversely elongated and 1 cm. in width on old trunks; spines yellow, in some cases slightly tinted at base, some more or less mottled after first year but semi-translucent, dirty yellow in age, one to three, the longest 2.5 cm., increasing to 4-5 cm. in length and four or five in number on old wood; flowers yellow, 10-11 cm. in diameter, petals 5 cm. long, obovate, usually notched at the rounded apex, filaments greenish below and white or yellowish above, style white, stigma large, in rare instances 1 cm. in diameter, white or slightly greenish tinged, flattened by incurving of points, eight- to nine-parted; fruit dark red throughout



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with subcircular areoles 3 mm. in diameter, the upper especially with prominent spicules 3-4 mm. long, merging imperceptibly into the delicate, fugacious spines which may be a cm. long or less.

This species was received from the Royal Botanical Garden at Berlin as *Opuntia Bergeriana* A. Weber, and has been grown with us in two situations in Texas and one in California. In some respects the plant does suggest *Opuntia Bergeriana* but the character of the flowers alone would exclude it from that species. It differs also in general habit, nature of spination and form and character of joints. In the season of 1914 our plants at Chico, California, blossomed profusely and set a good crop of fruit, but in no case did any seed form, the fruit being made up mainly of rind with a very small, empty seed cavity, save for the minute dried ovules. In 1915, however, the earlier fruits did not differ very materially from those of the previous year except that two or three seeds were produced in the fruit; but later crops, blossoming in late June and early July, produced an abundant seed crop. The species is carried in our collections under No. 2825 S. T. G. Its habitat is not known.

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Explanation of plate 30

OPUNTIA LONGICLADA Griffiths

Terminal joints and flower buds, about half natural size, cultivated at Chico, California.